

cylinder.

22
28.

27 The method of claim 18, further comprising carrying the web on a wire around said drying cylinders and said suction rolls or cylinders such that the wire runs in a meandering fashion over said drying cylinders and said suction rolls or cylinders and blowing air into spaces defined between the wire and said suction rolls or cylinders.

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29.

The method of claim 18, further comprising arranging a first steam box to apply steam onto a first side of the web in the free draw and arranging a second steam box to apply steam onto an opposite side of the web in the free draw.

REMARKS

Reconsideration of the present application, as amended, is respectfully requested.

In the Office Action dated June 15, 1993, the Examiner rejected claims 7 and 18-21 under 35 U.S.C. §112, second paragraph, the Examiner stating that the last line of claims 7 and 18 recited alternative embodiments which rendered the claims indefinite.

In response to the Examiner's rejection, claim 18 has been amended to set forth that steam is applied "onto at least one side of the paper web" to thereby remove the word "or". Claim 7 has been cancelled.

In view of the changes made to claim 18, it is respectfully submitted that the Examiner's rejection under 35 U.S.C. §112 has been overcome and should be removed.

In the Office Action, the Examiner rejected claims 1, 3, 5, 6, 8, 9, 16, 17 and 22 under 35 U.S.C. §102(b) as being anticipated by Chuse, the Examiner stating that element 67 "is the claimed counter face". The Examiner indicated that claims 7, 10-15 and 18-21 would

be allowable if rewritten in independent form or to remove the informalities under 35 U.S.C. §112.

Briefly reviewing the presently claimed invention, a method and apparatus for reducing the tendency of paper to curl in the drying section of a paper machine are disclosed herein. As set forth in claim 8, hot steam is applied substantially onto the entire width of the paper web in the drying section whereby tensions that have been formed, or that tend to be formed, in the fiber mesh of the paper web as the paper web runs through the drying section are relaxed by means of heat and moisture in the area of their formation, or substantially immediately thereafter.

Thus, the apparatus is directed to a solution for the tensions formed in the drying section as the web runs over the drying cylinders.

Some advantages achieved by the application of steam in the steam treatment in accordance with the present invention include the substantially uniform curling and moisture profile which prevent uneven tensions from arising in the web and also the relaxation of the tensions forming in the fiber mesh of the paper web. Other advantages are the control of the moisture profile in a direction of thickness of the paper web and the prevention of the tendency of the paper web to curl in the run of the paper web through the drying section.

These advantages are not hinted or suggested by the Chuse references nor would one skilled in the art be motivated to alter the Chuse reference to arrive at the presently claimed invention.

The Examiner pointed to element 67 in Chuse as the "claimed counter face" of the present invention. However, in contrast to the present invention, the purpose of the device 67 in Chuse is not to relax the drying tensions produced in the web but to bring the final moisture to a right level for the after-treatment, i.e., calendaring of paper (see page 3, left-hand column, lines 24-36 or

page 5, left-hand column, lines 72-75). Thus, element 67 is actually only a part of a whole which only provides a final adjustment of the moisture of the paper web as it collects water condensed (condensate) from the moist air (see page 5, right-hand column, lines 16-20). As such, it is respectfully submitted that the presence of element 67 in Chuse does not approach the applicant's inventive device and method.

Moreover, the function of the counter face 67 in association with the other elements of Chuse achieves a substantially different purpose than that to which the present invention is directed. The overdrying and remoistening of the web described in U.S. Patent 2,091,805 is generally used in SC machines in particular before the calendaring step. In spite of the operation of the element 67, the drying process itself has to be regulated in order to control the curling by e.g., adjusting the steam pressures of the upper and lower cylinders in the last twin-wire draw group. Thus, in contrast to the present invention, the purpose of the method of Chuse is to improve the calenderability of the web, and not to control the curling of paper which obviates the need for other changes in the drying process.

In further contrast to the present invention, there are no means provided in Chuse to relax the tensions formed in the drying section of the paper machine around the drying cylinders or provide means for substantially uniform curling and moisture profiles. The counter face 67 of Chuse cannot control the moisture profile in a direction of thickness of the paper web during the run of the web through the drying section with the added advantage that the tendency of the paper web to curl is prevented.

In sum, it is respectfully submitted that there are substantial differences between the presently claimed invention and Chuse as set forth above. However, to further the prosecution of this application, in this Amendment, independent claims 1, 8 and 22

have been amended to set forth that the paper web is subjected to the steam treatment while being carried on a wire. In certain embodiments of the present invention, the web runs against a wire either in a single-wire draw whereby the steam treatment is applied to an opposite side of the web or alternatively, in a twin-wire draw in which the web runs between two wires. As now set forth in claims 1 and 22, the steam treatment is applied "to an open face of the paper web as it runs on a wire in a suction sector of a suction roll or cylinder..." which encompasses both of these embodiments. The Examiner attention is also directed to another embodiment of the present invention claimed in independent claim 18 in which the feature of the web running in a free draw is set forth.

Chuse does not disclose or suggest the feature of carrying the web on a wire during the steam treatment or in a free draw. Rather, the web runs unsupported by any wire against a suction roll through the portion of the invention (67) which the Examiner indicated was a steam treatment similar to the applicant's present invention. There is no hint or suggestion in Chuse to provide either a wire on which the web runs and subjecting both the web and the wire to the steam treatment or a free draw.

It is noted that the Examiner indicated dependent claim 10 would be allowable over the prior art of record. Claim 10 includes the feature of "said steam box being placed in an area of said drying section having a single-wire draw on a suction zone of a suction-leading cylinder" which in the Examiner's opinion contributed to the allowability of this claim over the Chuse reference. Therefore, it is respectfully submitted that the amended independent claims including the feature of the web running on a wire (at least one wire) are likewise renders patentable over the Chuse reference.

In view of the arguments presented above, it is respectfully submitted that the Examiner's rejections of claims 1, 3, 5, 6, 8,

9, 16, 17 and 22 under 35 U.S.C. §102(b) has been overcome and should be removed.


New claims 23-29 have been added directed to additional embodiments of the applicant's invention. Claim 23 describes the structure of the suction roll as described in the specification page 11, lines 3-14. Claims 24-26 describe the blow boxes (page 9, lines 22-27), claim 27 describes the placement of a pair of steam boxes on opposite sides of the wire in the free draw (page 11, line 28 to page 12, line 2), claims 28-29 describes the inverted group adjacent to the normal group (Fig. 1, page 9, lines 6-12). No new matter has been added by the additional of these claims. The fee for adding these claims is submitted herewith.

In view of the actions taken and arguments presented, it is respectfully submitted that the present application is now in condition for allowance.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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